



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/562,937	12/30/2005	Hannu Makela	47121-5016-00 (220082)	8572
55694 7590 07/29/2009 DRINKER BIDDLE & REATH (DC) 1500 K STREET, N.W. SUITE 1100 WASHINGTON, DC 20005-1209				
EXAMINER				
KONG, SZE-HON				
ART UNIT		PAPER NUMBER		
3661				
MAIL DATE		DELIVERY MODE		
07/29/2009		PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/562,937

Applicant(s)

MAKELA ET AL.

Examiner

SZE-HON KONG

Art Unit

3661

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 April 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SF/ICE)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 4/29/2009 have been fully considered but they are not persuasive.

On page 13 and 14 of the Applicant's Response, Applicant argues "in Hakkinen the wireless data connection serves only for transmitting data and the positioning is performed by conventional measuring means..." and "Breakfield only discloses sending previously filed positioning data. In Breakfield, the radio transmission serves only for data transfer (as in Hakkinen) of previously filed positioning data. In the present invention, the location of the mining vehicle is performed in the wireless network on the basis of the location of the at least one base station. As such, no physical markers in the mine and no machine vision in the vehicle are needed. Accordingly, Breakfield fails to disclose the feature of the at least one base station, as defined in independent Claims 1 and 7".

The Examiner respectfully disagrees with the Applicant. Hakkinen and Breakfield not only transmit/transfer data with the wireless data connection and perform positioning in a conventional method as stated. Both Hakkinen and Breakfield disclose teaching of determining the location and position of a mining vehicle accurately with physical markings/tags/markers. These markings/tags/markers are networks of physical base stations providing the same feature of the at least one base station as claimed in independent claims 1 and 7, providing location data of the mining vehicle and cause to establish a data communication connection with the wireless network. Further, the

present invention requires base stations be placed throughout the mine, same as physical markers. It is noted that the statement of "no physical markers in the mine and no machine vision in the vehicle are needed" does not have relation and not described in the claims presented.

On page 14 of the Applicant's Response, Applicant argues the combination of Hakkinen and Breakfield would not have been obvious because Hakkinen teaches that no fixed infrastructure should be built into a mine for establishing positioning and Breakfield teaches to place a plurality of physical waypoint markers into the mine and thus teaches into a opposite direction.

The Examiner respectfully disagrees with the Applicant. Hakkinen suggests a known method for establishing positioning using fixed infrastructure and teaches a positioning method using physical markers. It would have been obvious to modify the teaching and suggestion of Hakkinen to use and/or replace the physical markers with Breakfield's physical waypoint markers which provide the same features and/or establishes a fixed infrastructure in the mine.

On page 15 of the Applicant's Response, Applicant argues neither of the two citations discloses or teaches performing positioning in the wireless network on the basis of the location of the at least one base station and both radio transmission system is used only for transmitting data.

The Examiner respectfully disagrees with the Applicant. It is noted that base station, given its broadest reasonable interpretation is not so limiting and a physical marker and/or waypoint can be considered a base station, a known physical location in

the system. Further, both references' radio transmission system is used for transmitting control data and location/positioning data of mining vehicle for teleoperation when necessary and monitoring (for example, col. 2, lines 55-61 of Hakkinen).

On page 15 of the Applicant's Response, Applicant argues the referred text portion of Breakfield relates to improving the accuracy of the GPS positioning system based on satellite access and Hakkinen relates positioning in underground mines where satellite access is not possible and therefore would not have been obvious to combine these references.

The Examiner respectfully disagrees with the Applicant. Both references teach positioning mining vehicle underground where satellite access is not possible. The text portion discloses the use of differential GPS system that uses a network of fixed, ground-based reference stations at known fixed position to determine/improve positioning and therefore determine the location of the mining vehicle using ground-based reference stations in case GPS signal is lost.

On page 15-16 of the Applicant's Response, Applicant argues that "it would be illogical to substitute the markings of Hakkinen with any base stations as suggested by the Examiner since Hakkinen teaches to avoid any infrastructure to be built into the mine, Breakfield teaches placing a plurality of physical waypoint markers into a mine and not a plurality of base stations" and Breakfield mentioned "base station" in connection to GPS-positioning system and "taught that one single "base station" can be used".

The Examiner respectfully disagrees with the Applicant. For substituting the markings of Hakkinen with Breakfield's markers, please refer to the explanation discussed above. Breakfield mentioned "a base station", but is to describe that it is known in the art that such base station is to provide error correction. In fact, the base station located at a precisely known position of accuracy refers to the use of differential GPS that utilizes multiple base station, ground-based stations with known referenced position for accurately determine positions.

On page 16 of the Applicant's Response, Applicant argues "Breakfield fails to provide any information as to where the base station is placed, i.e., it could be placed just outside the mine" and "there is no teaching in Hakkinen or Breakfield registering the visits of the mining vehicle to the coverage area of any base station".

The Examiner respectfully disagrees with the Applicant. Breakfield does not explicitly disclose the location of the base station and that it is reasonable for Applicant to suggest that it could be placed just outside the mine. However, it is also reasonable and obvious to place the base station in any location as desired and in locations where accurately determining the location of the mining vehicle is desired or any location that is considered critical as necessary. Both Hakkinen and Breakfield disclose monitoring location of the mining vehicle and tracking position of the vehicle via digital maps (col. 3, lines 34-45 of Hakkinen), registering the visits of the mining vehicle. It seems that Applicant tries to refer "registering the visits" as keeping a record of the location of the mining vehicle. Even so, it is well known and easily achievable task to keep logs for reports, analysis and various other purposes.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 2, 4-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hakkinen (6,616,244), Breakfield et al. (6,859,729) and Bahl et al. (6,839,560).

For claims 1, 4, 7, 8, 11 and 14, Hakkinen discloses a mine control system for monitoring and determining the location of a mining vehicle in a mine (Abstract), where the mining gallery includes number of sections (Fig. 1). The mining vehicle determines its location by measuring means arranged in the mining vehicle, wireless data transmission for connecting between the control room and the mining vehicles and control information is transmitted from the control room to the mining vehicles (Col. 3, lines 20-33); the mine vehicle comprises an inertial measuring device and ultrasonic scanners and transmit the measured information for creating a map of the mine (Col. 3, lines 34-54). It would have been obvious that the measuring information for creating a map of the mine keeps a register of the movements of the mine vehicle in the mine.

Hakkinen disclose arranging markers in the mine for location determination and establish data communication between the mining vehicle and the wireless network (Col. 3, lines 24-50) but does not specifically disclose the coverage area of a base station in the first mine section; arranging at least one base station in the second mine section for establishing a data communication connection between the mining vehicle

and the wireless network in the first mine section; determining the location of the mining vehicle in the first mine section by means of positioning performed in the wireless network based on the location of at least one base station in the first mine section.

Breakfield discloses number of physical waypoint markers locate in known position along a path for relaying position information to vehicles with wireless communication technique including radio transmission (Fig. 2 and Col. 5, lines 41-67). Bahl discloses a system for locating and tracking devices using plurality of wireless base stations placed in different sections of a building and determine the devices location based on the location of at least one base station and signal strength, coverage area (Fig. 2, 3 and col. 4, line 54 – col. 5, line 10). It would have been obvious for one of ordinary skill in the art at the time the invention was made to modify the invention of Hakkinen to arrange base stations for establishing wireless data communication between the mining vehicle and the network, taught by Breakfield and arrange base stations in desired location within the mine, taught by Bahl to improve the determination of the location of the mine vehicle.

For claims 2 and 9, Hakkinen discloses an inertial measuring device produces continuous location information of the position of the measuring vehicle in the mine and measuring devices, for example, ultrasonic scanners. It is well known in the art that common inertial measuring devices, for example, gyroscopes and accelerometers determine travel direction (Col. 4, lines 34-50).

Hakkinen does not specifically disclose calculating the distance traveled for the vehicle but it would have been obvious for one of ordinary skill in the art at the time the invention was made that the markings on the walls of the mine as disclosed represent location and positioning of the vehicle, can also represent the distance traveled by the vehicle. Breakfield discloses laser tracking system for accurate distance measurement, compass navigation and/or wheel encoders for supplying angular information and combination of the navigation devices for distance and angular control (Col. 4, lines 45-65). It would have been obvious for one of ordinary skill in the art at the time the invention was made to modify the invention of Hakkinen to calculate the distance traveled by the vehicle, taught by Breakfield to accurately determine the location of the vehicle.

For claim 5, Hakkinen discloses the inertial measuring device produces continuous location information on the position of the vehicle (Col. 4, lines 34-50).

Hakkinen does not disclose comparing the location determined by the measuring device with the location determined by the wireless network when in the first mine section, and updating the location of the mining vehicle to correspond to the location determined by the wireless network. Breakfield discloses correcting the error of the position of the vehicle by base station with known position for absolute accuracy using differential GPS when available (Col. 7, lines 23-56). It would have been obvious for one of ordinary skill in the art at the time the invention was made to modify the invention of Hakkinen to correct the positioning error of the vehicle by the base station, taught by

Breakfield to improve the accuracy of positioning the vehicle.

For claims 6 and 10, Hakkinen discloses marking additional control marks in the mine for position determination and marking critical locations in the mine, for example drilling location and drill holes to be charged. Col. 4, lines 40-50, discloses updating the control system of the mine with the new section formed (Col. 3, lines 46-54).

Hakkinen does not disclose placing additional base stations belonging to the wireless network. Breakfield discloses base stations wireless network (Fig. 2). It would have been obvious for one of ordinary skill in the art at the time the invention was made to modify the invention of Hakkinen to replace the marks with additional base stations, taught by Breakfield to expand coverage and improve positioning accuracy at desire locations.

For claims 12 and 13, Hakkinen discloses the network of positioning marks provide altitude or coordinates of the location of the mark, which provide the location information of the mining vehicle (Col. 4, line 62 - col. 5, line 13) but does not specifically disclose establishing a connection to one base station, creating communication between the mine vehicle and the base station whose signal level is the highest in the wireless network, the base stations each have a coverage area of transmitted signals and calculating the position of the mine vehicle in the coverage area of at least two base stations on the basis of the level of signals transmitted by the base stations. Bahl discloses detecting the signal strength of one or more wireless base

stations placed at known locations throughout a building and the mobile device can select the base station which provides the highest signal strength (Abstract, col. 4, line 54 – col. 5, line 2). The mobile computers monitor the signal strength of the base stations, coverage area of transmitted signals and the mobile computers can be located using the signal strength of at least two base stations (Table 1 and col. 5, line 41 - col. 6, line 8). It would have been obvious for one of ordinary skill in the art at the time the invention was made to modify the invention of Hakkinen to determine the location and connects the mining vehicle to one or more base stations within the mine in different sections based on the coverage area, signal strength of the base stations, taught by Bahl to effectively locate the mining vehicle with most reliable base stations.

3. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hakkinen (6,616,244), Breakfield et al. (6,859,729) and Bahl et al. (6,839,560) and further in view of Kageyama (6,480,769).

For claim 3, Hakkinen discloses an operator receive information regarding the picture and location of the position of the mining vehicle (Col. 3, line 65 – col. 4, line 7 and col. 4, lines 62-67 and col. 5, lines 20-24).

Hakkinen does not specifically disclose a manned mining vehicle, but it would have been obvious for one of ordinary skill in the art at the time the invention was made that the unmanned vehicle can be replaced by a manned vehicle where the operator can control the mine vehicle manually. Kageyama discloses monitoring the location of a manned mining vehicle in the mine and transmitting instructions to the operator of the

mining vehicle (Fig. 2 and col. 7, lines 25-53).

Conclusion

4. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SZE-HON KONG whose telephone number is (571)270-1503. The examiner can normally be reached on 7:30AM-5PM Mon-Fri, Alt. Fri. Eastern Time.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas Black can be reached on (571) 272-6956. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

7/22/2009

/SZE-HON KONG/
Examiner, Art Unit 3661

/Thomas G. Black/
Supervisory Patent Examiner, Art Unit 3661